CLAIMS:

1. A process for cooling a reactor effluent stream from a methanol-to-olefins reactor, the process comprising the steps of:

(a) supplying a methanol feed stream to the reactor in a methanol-to-olefins conversion process;

(b) contacting the methanol feed stream with a molecular sieve catalyst composition in the reactor to produce the reactor effluent stream comprising one or more olefin products; and

(c) heating high pressure saturated steam with the reactor effluent stream to produce high pressure superheated steam and resulting in a first cooled effluent stream.

2. The process of claim 1, further comprising the step of:

(d) heating a first water stream with the first cooled effluent stream to produce the high pressure saturated steam resulting in a second cooled effluent stream.

3. The process of claim 2, further comprising the step of:

(e) heating a second water stream with the second cooled effluent stream to produce medium pressure saturated steam and resulting in a third cooled effluent stream.

4. The process of claim 3, further comprising the step of:

(f) heating the methanol feed stream with the third cooled effluent stream resulting in a fourth cooled effluent stream.

5. The process of claim 1 wherein the step of (c) heating occurs in a first heat exchanger.

6. The process of claim 5, wherein the reactor effluent stream as it enters the first heat exchanger has a temperature ranging from about 800°F (427°C) to about 1100°F (593°C) and a pressure ranging from about 20 psia (138 kPaa) to about 65 psia (448 kPaa).

7. The process of claim 5, wherein the high pressure superheated steam as it leaves the first heat exchanger has a temperature ranging from about 500°F (260°C) to about 1050°F (566°C) and a pressure ranging from about 400 psia (2758 kPaa) to about 1000 psia (6895 kPaa).

8. The process of claim 5, wherein the reactor effluent stream as it enters the first heat exchanger has a temperature ranging from about 900°F (482°C) to about 950°F (510°C) and a pressure ranging from about 25 psia (172 kPaa) to about 50 psia (345 kPaa).

9. The process of claim 5, wherein the high pressure superheated steam as it leaves the first heat exchanger has a temperature ranging from about 600°F (316°C) to about 900°F (482°C) and a pressure ranging from about 600 psia (4137 kPaa) to about 950 psia (6550 kPaa).

10. The process of claim 2 wherein the step of (d) heating occurs in a second heat exchanger.

11. The process of claim 10, wherein the first cooled effluent stream as it enters the second heat exchanger has a temperature ranging from about 555°F (290°C) to about 1000°F (538°C) and a pressure ranging from about 19 psia (131 kPaa) to about 63 psia (434 kPaa).

12. The process of claim 10, wherein the high pressure saturated steam as it leaves the second heat exchanger has a pressure ranging from about 400 psia (2758 kPaa) to about 1000 psia (6895 kPaa).

13. The process of claim 10, wherein the first cooled effluent stream as it enters the second heat exchanger has a temperature ranging from about 600°F (316°C) to about 900°F (482°C) and a pressure ranging from about 19 psia (131 kPaa) to about 63 psia (434 kPaa).

14. The process of claim 10, wherein the high pressure saturated steam as it leaves the second heat exchanger has a pressure ranging from about 600 psia (4137 kPaa) to about 950 psia (6550 kPaa).

15. The process of claim 3 wherein the step of (e) heating occurs in a third heat exchanger.

16. The process of claim 15, wherein the second cooled effluent stream as it enters the third heat exchanger has a temperature ranging from about 445°F (229°C) to about 800°F (427°C) and a pressure ranging from about 18 psia (131 kPaa) to about 61 psia (421 kPaa).

17. The process of claim 15, wherein the medium pressure saturated steam as it leaves the third heat exchanger has a pressure ranging from about 30 psia (207 kPaa) to about 400 psia (2758 kPaa).

18. The process of claim 15, wherein the second cooled effluent stream as it enters the third heat exchanger has a temperature ranging from about 480°F (249°C) to about 700°F (371°C) and a pressure ranging from about 18 psia (131 kPaa) to about 61 psia (421 kPaa).

19. The process of claim 15, wherein the medium pressure saturated steam as it leaves the third heat exchanger has a pressure ranging from about 125 psia (862 kPaa) to about 165 psia (1138 kPaa).

20. The process of claim 4 wherein the step of (f) heating occurs in a fourth heat exchanger.

21. The process of claim 20, wherein the third cooled effluent stream as it enters the fourth heat exchanger has a temperature ranging from about 225°F (107°C) to about 450°F (232°C) and a pressure ranging from about 23 psia (159 kPaa) to about 69 psia (476 kPaa).

22. The process of claim 20, wherein the methanol feed stream as it leaves the fourth heat exchanger has a pressure ranging from about 40 psia (276 kPaa) to about 80 psia (552 kPaa).

23. The process of claim 20, wherein the third cooled effluent stream as it enters the fourth heat exchanger has a temperature ranging from about 250°F (121°C) to about 500°F (260°C) and a pressure ranging from about 25 psia (172 kPaa) to about 61 psia (421 kPaa).

24. The process of claim 20, wherein the methanol feed stream as it leaves the fourth heat exchanger has a pressure ranging from about 40 psia (276 kPaa) to about 60 psia (414 kPaa).

25. A process for producing one or more olefin products from a methanol feed stream in a reactor, the process comprising the steps of:

(a) supplying the methanol feed stream to the reactor;

(b) contacting the methanol feed stream with a molecular sieve catalyst composition in the reactor to produce an effluent stream;

(c) heating high pressure steam with the effluent stream;

(d) heating medium pressure steam with the effluent stream; and

(e) recovering the one or more olefin products from the effluent stream, wherein step of (e) recovering occurs after step of (d) heating.

26. The process of claim 25, wherein the step of (c) heating comprises the steps of:

(c-i) heating high pressure saturated steam with the effluent stream to produce high pressure superheated steam; and

(c-ii) heating water with the effluent stream to produce the high pressure saturated steam, wherein the step of (c-i) heating occurs before step of (c-ii) heating.

27. The process of claim 25, further comprising the step of:

(g) heating the methanol feed stream with the effluent stream.

28. The process of claim 27, wherein the step of (c) heating occurs before the step of (d) heating.

29. The process of claim 28, wherein the step of (g) heating occurs after the step of (d) heating.

30. The process for heating methanol in a methanol feed stream, the process comprising:

(a) heating with a heat source a methanol feed stream;

(b) supplying the methanol feed stream to a reactor;

(c) contacting the methanol feed stream with a molecular sieve catalyst composition in the reactor and removing a reactor effluent stream; and

(d) cooling the reactor effluent stream in no less than three heat exchangers to produce a cooled effluent stream, wherein the cooled effluent stream is the heat source.

31. The process of claim 30, wherein the methanol feed stream comprises unreacted methanol feed.

32. The process of claim 30, wherein, the step of (a) heating occurs in a first methanol boiler system that uses the heat source to heat the methanol.

33. The process of claim 32, wherein, the step of (a) heating occurs in a second methanol boiler system that does not use the heat source to heat the methanol.

34. A process for producing one or more olefin products from methanol in a reactor, the process comprising the steps of:

(a) supplying a methanol feed stream to the reactor;

(b) contacting the methanol feed stream with a molecular sieve catalyst composition in the reactor and withdrawing an effluent stream having a first temperature;

(c) cooling the effluent stream in no less than four stages to produce a cooled effluent stream, wherein each of the four stages decreases the effluent stream temperature by no less than 50°F (28°C) and wherein the effluent stream has a second temperature after the four stages that is at least 500°F (280°C) less than the first temperature.

35. The process of claim 34, wherein the four stages decreases the effluent stream temperature by no less than 75°F (42°C).

36. The process of claim 34, wherein the four stages decreases the effluent stream temperature by no less than 100°F (56°C).

37. The process of claim 34, wherein the four stages decreases the effluent stream temperature by no less than 125°F (69°C).

38. The process of claim 34, wherein the four stages decreases the effluent stream temperature by no less than 150°F (83°C).

39. The process of claim 34, wherein the second temperature is at least 600°F (333°C).

40. The process of claim 34, wherein the second temperature is at least 700°F (389°C).

41. The process of claim 34, wherein the second temperature is at least 800°F (444°C).

42. The process of claim 34, wherein the second temperature is at least 900°F (500°C).